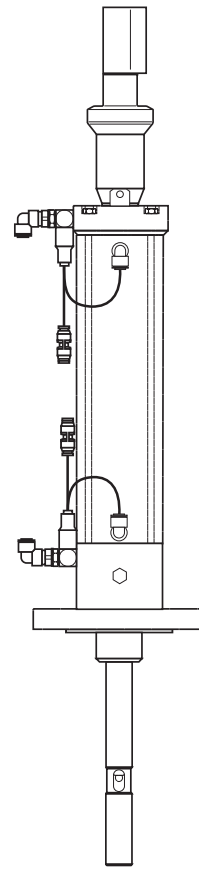
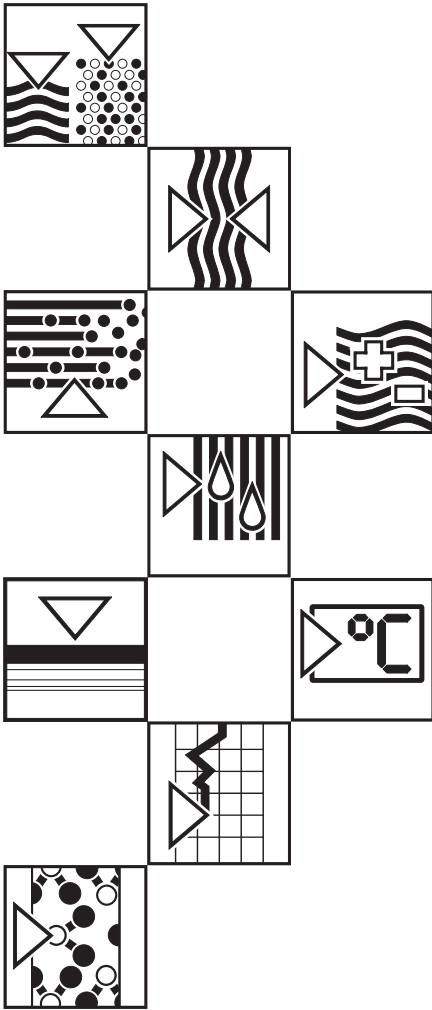


profit CPA 463S Retractable assembly for pH / redox measurement

Operating Instructions



Quality made by
Endress+Hauser



ISO 9001

Endress + Hauser

Nothing beats know-how



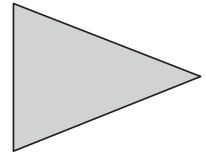
Please refer to the following chapters for information on the assembly:



General information



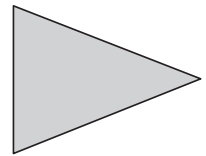
Description of assembly



You wish to install and connect the assembly.
The required steps are described in this chapter:



Installation



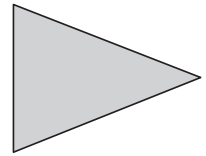
You wish to operate the assembly.
The required steps are described in these chapters:



Operation



Calibration



Please refer to this chapter for maintenance instructions:



Maintenance

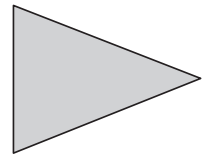


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1 General information

1.1 Symbols used

**Warning!**

This symbol alerts to hazards which may cause irreparable damage.

**Caution!**

This symbol alerts to possible malfunction due to operator error.

**Note!**

This symbol indicates important items of information.

1.2 Safety notes

These installation and operating instructions describe the intended use of the assembly.

**Warning**

Operating the assembly in any way other than as described in these instructions may compromise the safety and function of the assembly and systems connected and is therefore impermissible.

Connection and maintenance work performed on this device may only be carried out by trained personnel.

Repairs may be performed at the manufacturer's works or by the Endress+Hauser Service Organization only.

Interventions in or changes to the device are impermissible and will void the warranty.

It is the operator's responsibility to assure that local safety regulations are observed.

2 Description of assembly

2.1 Design

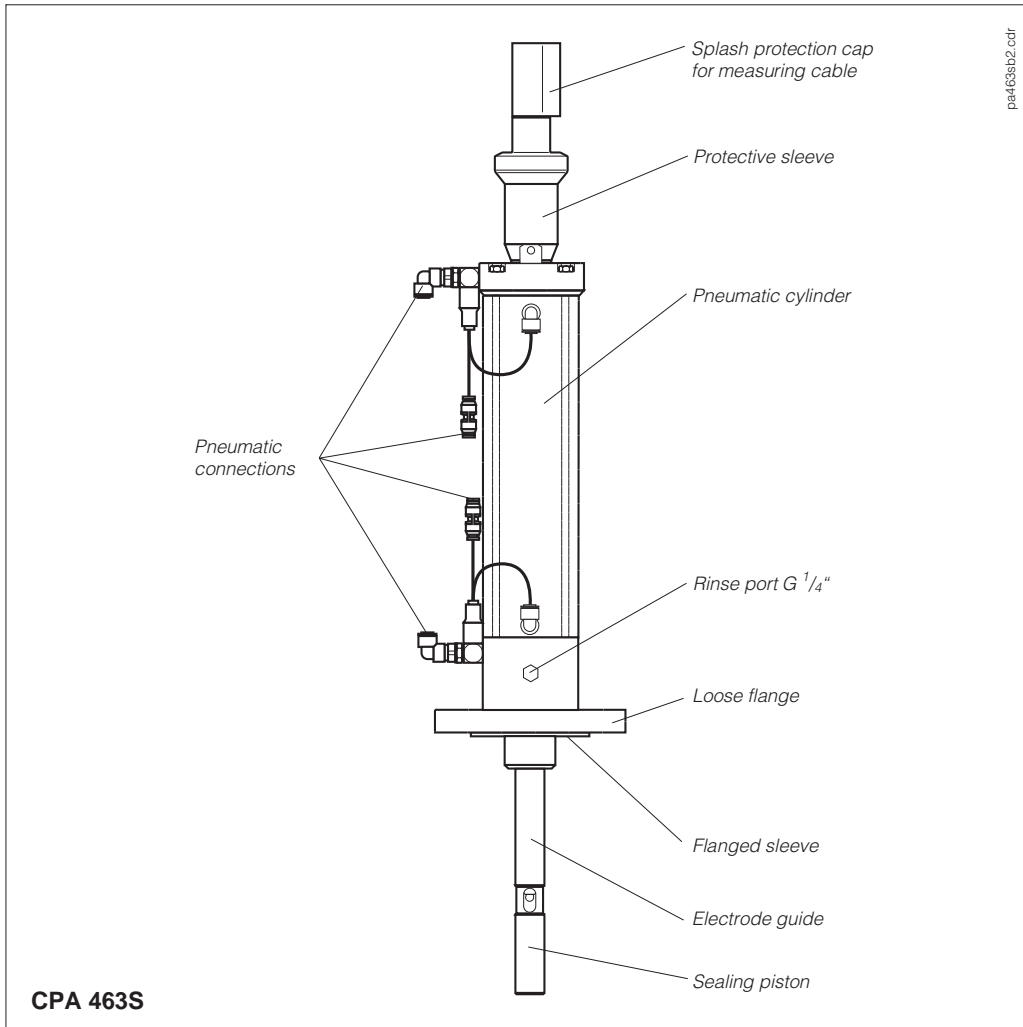


Fig. 2.1 Design of Probit assembly CPA 463S

2.2 Areas of application

The assemblies from the Probit CPA 463S family permit pH or redox electrodes to be sealed off from the medium, cleaned, calibrated or changed under process conditions. Versions made of plastic and metallic materials are available to meet a variety of industrial requirements. These assemblies are operated pneumatically. The Probit CPA 463S is particularly suitable for the following areas of application:

- Chemical production
- Textile industry
- Waste water treatment
- Water processing
- Electrode-critical processes
- Tank filling systems
- Power plants
- Automated pH measurement

2.3 Measuring system

A measuring system comprises:

- the Probit CPA 463S assembly
- a pH/redox electrode suitable for the assembly and medium to be measured
- a pH/redox measuring instrument, e.g. CPC 200/210
- Measuring cable CPK 7 (ready-made)
- Connecting hoses for calibration buffer solutions and cleaning agent

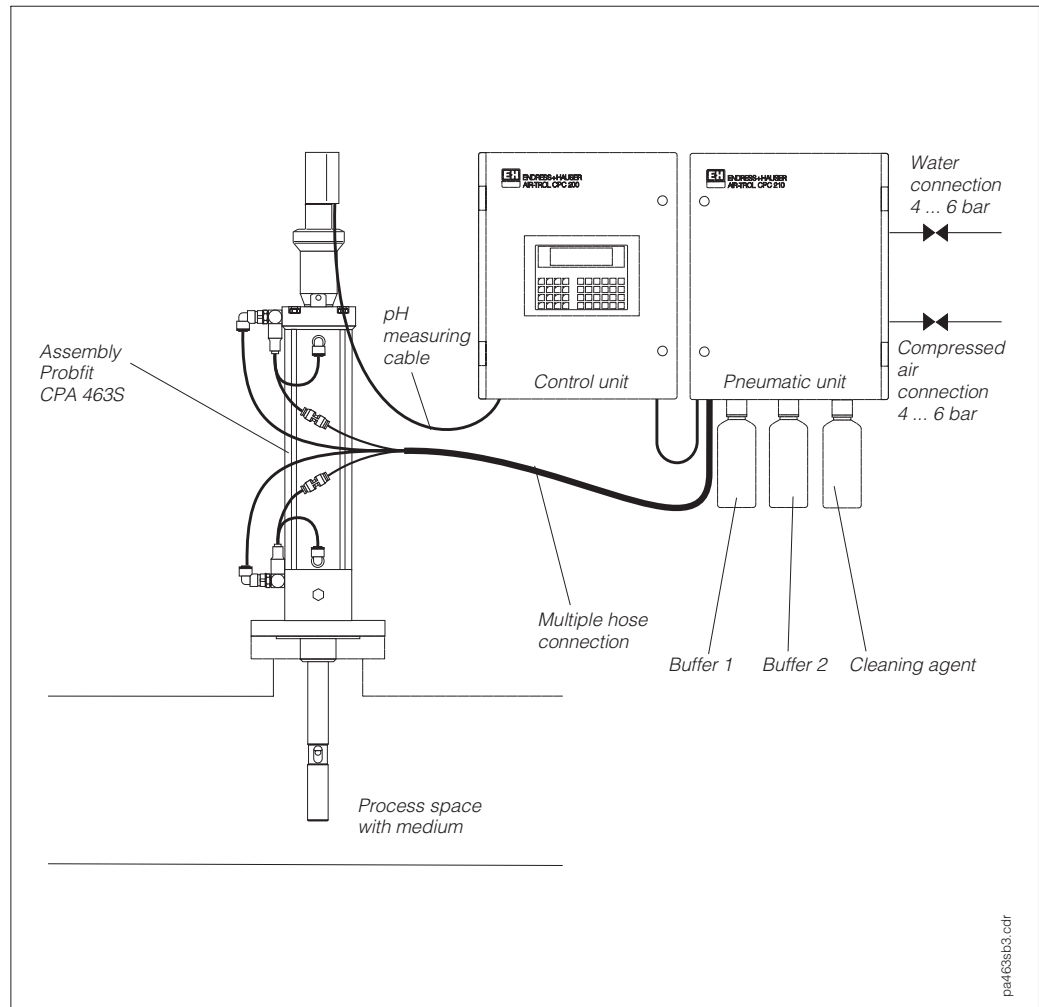


Fig. 2.2 Example of a complete measuring system

2.4 Function

The retractable CPA 463S assemblies are mounted using a loose flange. The electrode guide with the built-in pH/redox electrode can be moved into the process pneumatically for measurement, or withdrawn into the assembly for calibration, cleaning or electrode replacement.

When withdrawn, the assembly is sealed off from the process by means of a sealing piston. This permits cleaning, calibration and electrode changes to take place without interrupting the process.

The retractable assemblies CPA 463S-R and CPA 463S-A can be remote-controlled pneumatically and are distinguished by the following features:

- Two pneumatic signal outputs for the “measurement” and “service” limit positions are available for purposes of control or visual indication.

This greatly simplifies controlling the assembly. A pneumatic changeover switch is basically all that is needed. Installation is very simple since only 4 pneumatic control lines are connected to the assembly.

The CPA 463S-A is equipped with a rinse port adapter (water valve block) with 5 connections. This water valve block can be retrofitted on the CPA 463S-R.

2.5 Ordering system

pH process assembly Probit CPA 463S

Version
 A With rinse/calibration connection for Airtrol
 R With rinse connection
 Y Special version

Immersion depth / material
 01 165 mm / PVC
 02 165 mm / PVDF/PEEK
 12 265 mm / PVDF/PEEK
 03 165 mm / 1.4571
 13 265 mm / 1.4571
 04 165 mm / Hastelloy C4
 14 265 mm / Hastelloy C4
 05 165 mm / PEEK
 15 265 mm / PEEK
 99 Special version


O-ring material
 1 EPDM
 2 Viton
 4 Chemraz
 9 Special material

Mounting types
 1 Installation via DN50 flange
 2 Installation via 2" ANSI flange
 9 Special version

CPA 463S-

--	--	--	--

 ← complete order code



ENDRESS+HAUSER
CPA463S-A611

order code : CPA463S-A611

serial no. : _____ XF

spec. pressure: PN=6bar(20°C) T=100°C

126602-4A

zpa463s.tif

Fig. 2.3 Nameplate of Probit CPA 463S-A

2.6 Accessories

The range of special accessories for the Probit CPA 463S assemblies available from Endress+Hauser includes:

- Water valve block, order no. 50048118
- Retraction security lock, order no. 50051999
- Protective sleeve for liquid-filled electrode CPS 41, order no. 50048071
- pH/redox combination electrodes according to the following tables

pH combination electrodes, length 360 mm

Electrode type	Temperature	pH range
CPS 11-1AA5GSA	0 ... 80 °C	1 ... 12
CPS 11-2AA5TSA	0 ... 80 °C	1 ... 12
CPS 11-1BA5GSA	10 ... 130 °C	1 ... 14
CPS 11-2BA5TSA	10 ... 130 °C	1 ... 14
CPS 41-2BB5TSS	10 ... 120 °C	1 ... 14

Redox comb. electrode, length 360 mm

Electrode type	Temperature	pH range
CPS 12-0PA5GSA	-15 ... 130 °C	1 ... 14

2.7 Technical data

Materials used					
CPA 463S R/A/H types	PVC	PVDF	1.4571	PEEK	HC4
Part					
Pneumatic cylinder	PVC	PVC	PVC-C	PVC-C	PVC-C
Housing	PVC	PVDF	PVDF	PEEK	PEEK
Electrode guide	PVC	PEEK	1.4571	PEEK	HC4
Flanged sleeve	PVC	PVDF	1.4571	PEEK	HC4
Flange	PVC	UB-GF	1.4571	UB-GF	1.4571

Pressure and temperature	
CPA 463S-R/-A	
PVC	6 bar / 20 °C; 0 bar / 60 °C
PVDF	6 bar / 20 °C; 1 bar / 100 °C
1.4571, PEEK, HC4	6 bar / 100 °C
Connections	
Compressed air	filtered (≤ 5µm), water- and oil-free
Compressed air pressure	3 ... 6 bar
O-rings	EPDM, Viton, Chemraz
CPA 463S-A: rinse port	inlet G 1/4", outlet G 1/4"
Water valve block flushing connections	5 x for hose OD6 / ID4
CPA 463S: control lines	4 x for hose OD6 / ID4
Weight (for immersion depth 165 / 265 mm)	
PVC version	3.5 kg / 5 kg
PVDF, PEEK versions	3.5 kg / 5 kg
1.4571, HC4 versions	5.5 kg / 8 kg
Electrodes (selection) pH combination electrode type Orbisint CPS 11, length 360 mm	
. also with integrated Pt 100	
Attachment 4-hole flange DN 50/PN 10 acc. to DIN; ANSI 2" flange	
Connecting dimensions (also see fig. 3.2)	

3 Installation

3.1 Unpacking

Inspect for any damaged packaging! The post office or freight carrier must be informed of any damage. Damaged packaging material must be retained until the matter has been settled!

Verify that the contents are undamaged! Inform the post office or freight carrier as well as the supplier of any damage.

Check that the delivery is complete and agrees with the delivery papers and your order:

- Quantity delivered
- Assembly type and version according to nameplate (see fig. 2.3)
- Accessories
 - Installation and operating instructions
 - Socket wrench (size 17) for electrode replacement
 - Hose guidance clamp
 - Electrode support sleeve

If you have any questions, consult your supplier or the Endress+Hauser sales agency in your area (see back cover of these operating instructions for addresses).

3.2 Dimensions

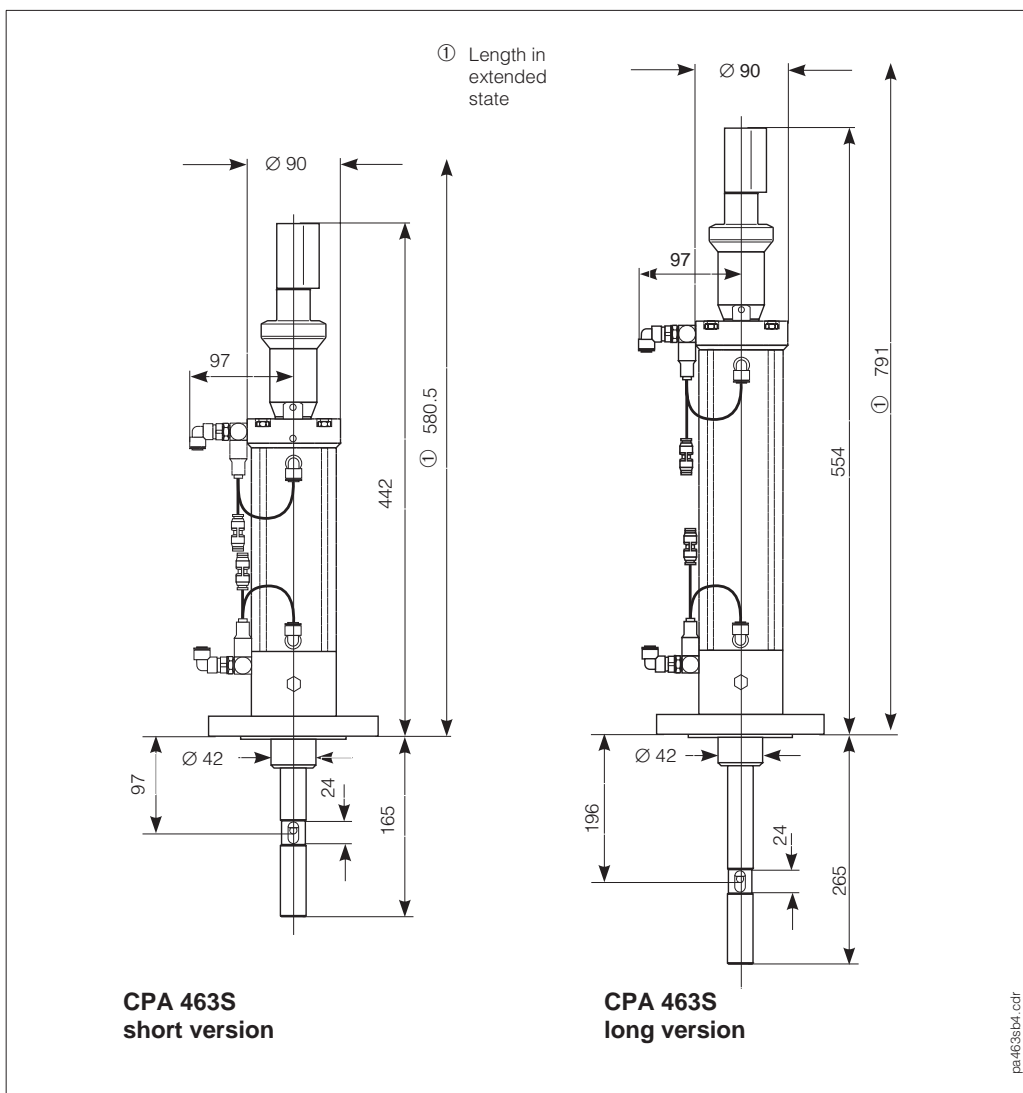
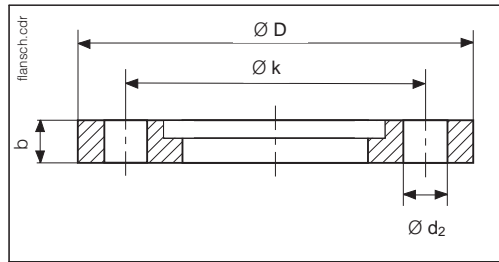


Fig. 3.1: Dimensions of Profit CPA 463S

3.3 Mounting



Flange version	Ø D	Ø k	Ø d ₂	b
DIN flange DN 50/PN 10, 1.4571	165	125	18	18
DIN flange DN 50/PN 10, UP/GF	165	125	18	18
ANSI 2" flange, 150 lbs, 1.4571	152.4	120.6	19	19
ANSI 2" flange, PN 10, UP/GF	165	121	19	18

Fig. 3.2 Loose flanges used on Profit assemblies



Note

In the mounting position, the centre axis of the assembly must have a minimum inclination of 15° above the horizontal (see fig. 3.3).

The hole in the mating flange must have a diameter of at least 45 mm.

Immersion depth: 165 or 265 mm



Caution

The installation depth is to be chosen such that the protection guard is located in the medium.

Install the assembly according to the examples for installation in fig. 3.3 using M 16 bolts, nuts and washers. To facilitate bolt installation,

the assembly can be rotated somewhat in the longitudinal axis until firmly tightened.

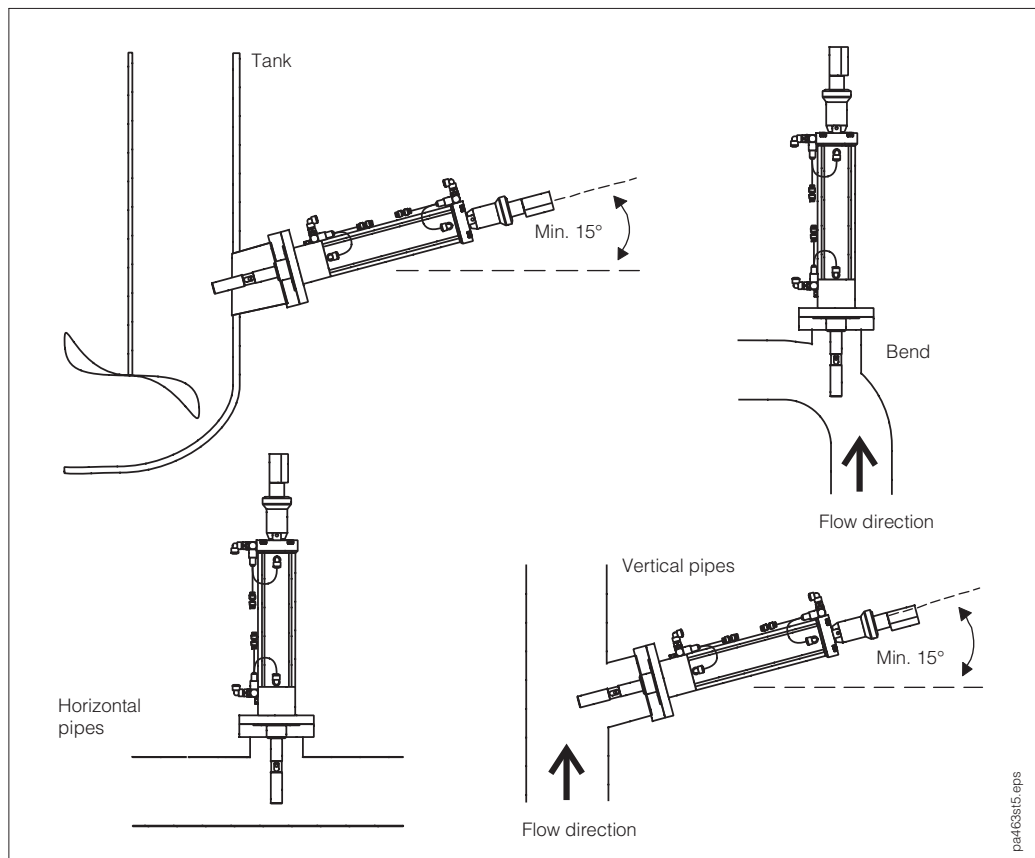


Fig. 3.3 Examples for installation

3.4 Electrode installation

Electrodes with a threaded Pg 13.5 plug-in head, a shaft length of 360 mm and a diameter of 12 mm can be installed.



Caution

Make sure that the O-ring and clamping ring are in place on the electrode shaft and that the watering cap is removed before installation. Move the assembly to the service position, i.e. electrode guide is moved out of medium.



Note

Wet the electrode shaft before installation in the assembly. Simply immerse in water to wet.

Short version (immersion depth 165 mm):

- Pull off the black splash protection cap and unscrew the red protective sleeve by turning it counterclockwise.
- Screw the electrode into the electrode guide hand-tight. Then tighten the electrode with a size 17 socket wrench approx. 1/4 revolution.
- Thread measuring cable CPK 7 with the electrode plug through the red protective sleeve and screw on the electrode plug.
- Reinstall the red protective sleeve (caution: do not skew thread!) and install the splash protection cap.

Long version (immersion depth 265 mm):

- Pull off the black splash protection cap and unscrew the red protective sleeve along with the piston rod. The red protective sleeve is permanently adhered to the piston rod.
- Screw the electrode into the electrode guide hand-tight. Then tighten the electrode with a size 17 socket wrench approx. 1/4 revolution.
- Before connecting the measuring cable to a measuring transmitter, the cable end must be threaded through the piston rod and protective sleeve. Then screw on the electrode plug.
- Reinstall the red protective sleeve/piston rod (caution: do not skew thread!) and install the splash protection cap.

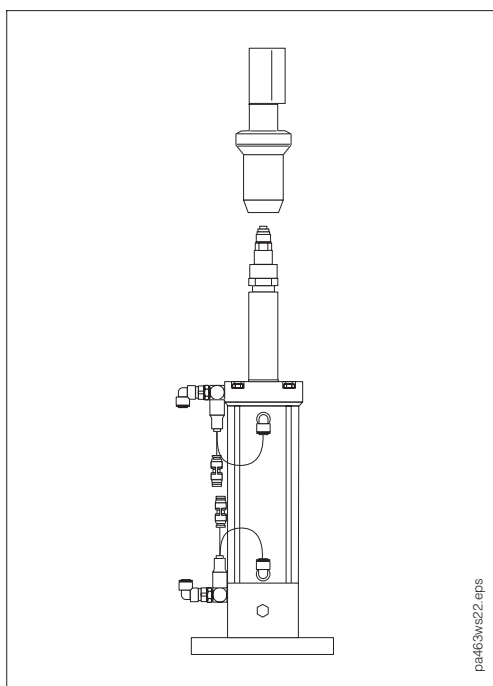


Fig. 3.4 Probit CPA 463S Electrode installation on short version

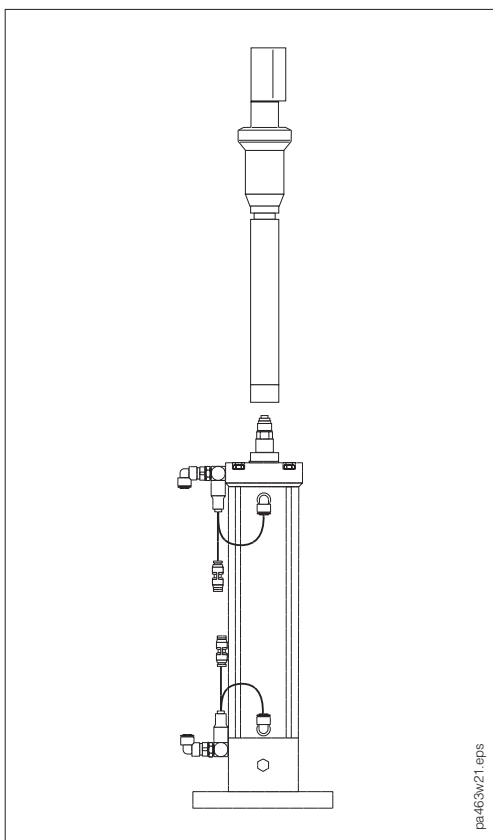


Fig. 3.5 Probit CPA 463S Electrode installation on long version

If the potential matching line is not used, cut off the brown potential matching wire (PMC) directly behind the shrink-down plastic tubing (see fig. 3.6).

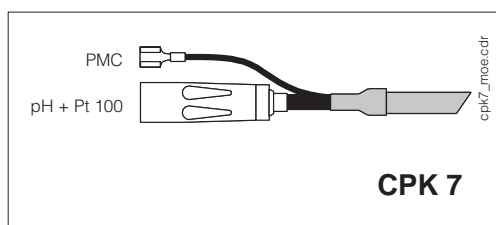


Fig. 3.6 Measuring cable CPK 7

3.5 Pneumatic connections, CPA 463S-R / CPA 463S-A

Establish the pneumatic connections, i.e. the compressed air connections for assembly control and "measurement" and "service" limit position feedback as shown in fig. 3.7.

The control states of the inlets and outlets are shown in the table in fig. 3.7.

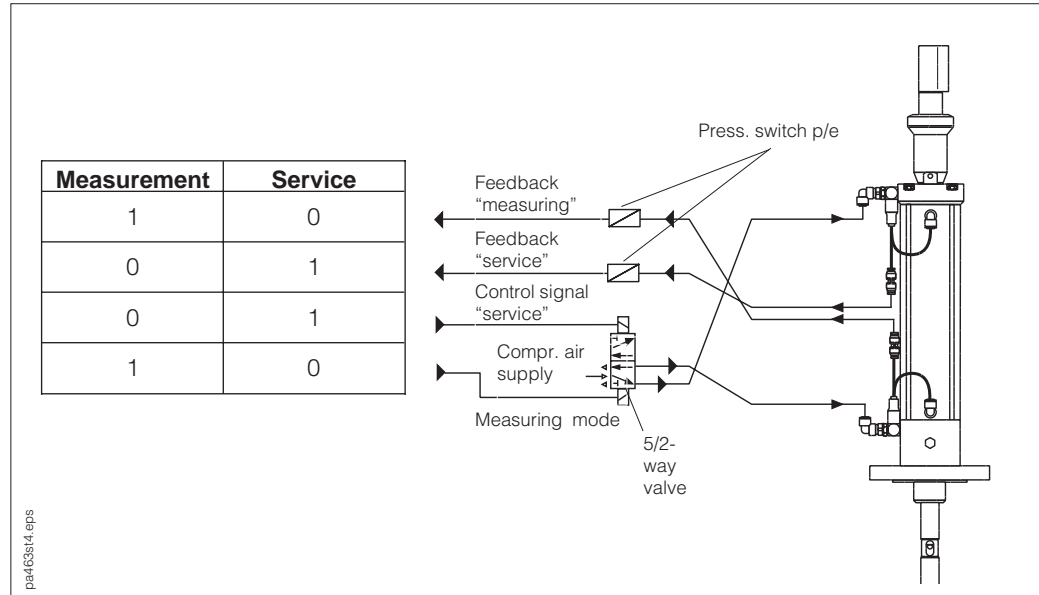


Fig. 3.7 Connection of pneumatic control



Caution

When the compressed air supply fails and the medium is under pressure, the assembly may not remain in the measuring position.

Use the retraction safety lock (order no. 50051999) to maintain the assembly in the measuring position in the event of an air supply failure.

If no Airtrol CPC 200/210 or other control unit is used, a 5/2-way valve and pressure switch must be provided by the operator.

3.6 Rinse port adapter

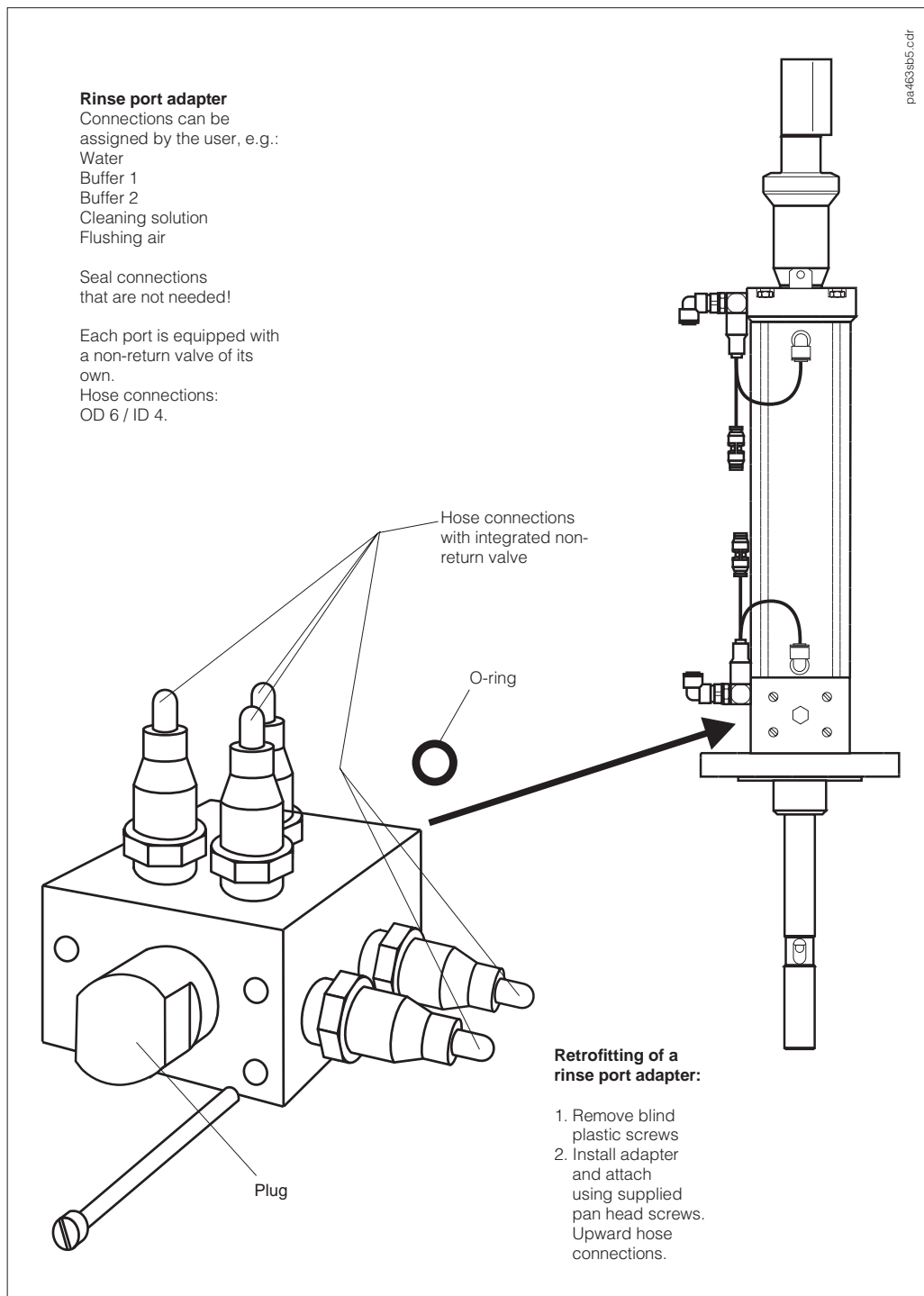


Fig. 3.8 CPA 463S-A with flushing adapter



Warning

The material of the inlet and outlet hoses connected to the flushing adapter must be resistant to cleaning agents and the medium to be measured.

4 Pneumatic operation

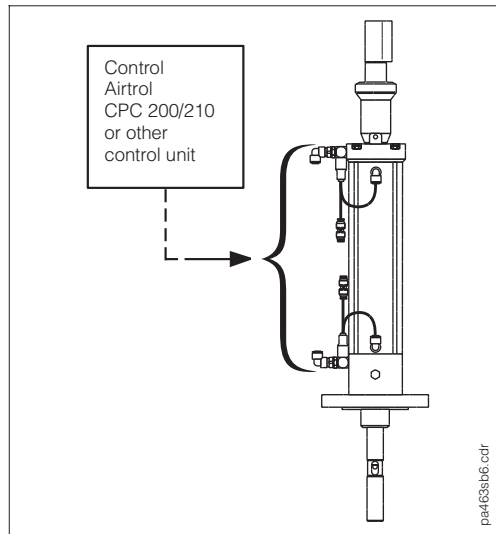


Fig. 4.1 Actuation of CPA 463S-R / CPA 463S-A



Warning

First start-up with the assembly mounted must be performed with the electrode installed!

A simple pneumatic changeover switch (5/2-way valve) suffices to remote-control the assembly.

When using the manual operating unit Airtrol 500, operating the assembly merely requires an additional external compressed air connection and the hose connection to the assembly.



Note

The control and measuring system Airtrol CPC 200/210 by Endress+Hauser permits fully automated pH measurement in conjunction with retractable Probit assemblies.

Refer to chapter 3.5 for the setup of a control system provided by the operator.

The pneumatic feedback signals can be evaluated by simple pressure switches.

Pneumatic operation of Probit CPA 463S-R / CPA 463S-A		
Step seq.	Sensor position	Measure
1	Meas.	Control connection „measurement“ and pneumatic feedback „measurement“ are supplied with compressed air.
2	–	Compressed air is supplied to the „service“ control connection (measurement connection unpressurised) to move the electrode guide to the „service“ position.
3	–	Electrode guide moves back into the assembly.
4	–	When the electrode guide has been withdrawn all the way, the pneumatic feedback „service“ receives compressed air.
5	Service	Clean sensor, flush, calibrate (if necessary, remove electrode for calibration).
6	–	Compressed air is supplied to the „measurement“ control connection („service“ connection unpressurised) to move the electrode guide to the „measurement“ position.
7	–	The electrode guide moves into the process space.
8	Meas.	The pneumatic feedback „measurement“ receives compressed air.

5 Calibration

Every pH or redox measurement must be calibrated regularly and carefully. The calibration cycles depend on the application and the degree of accuracy desired.

The calibration cycles are determined individually for each case. More frequent calibration is recommended at the beginning, e.g. once a week, to study the behaviour of the application. Calibration and cleaning at regular intervals will increase the measuring accuracy.



Caution

A symmetrical high-impedance connection requires an electrical connection between the potential matching line (PMC) and the buffer solution!

5.1 Calibration with the electrode removed

- Remove the electrode by reversing the sequence described in chapter 3.4.



Caution

The assembly must be unpressurised for electrode removal!

- Clean and dry the electrode.
- Inspect the electrode for physical damage.
- Immerse the electrode in the first buffer solution (e.g., pH 7).
- Adjust the instrument accordingly. Follow the calibration instructions supplied with the instrument.



Caution

Do not leave electrodes in distilled water!



Note

The outlet hose must not allow automatic buffer drainage from the flushing chamber (swan neck).

The calibration interval depends on process conditions and the medium measured.

See chapter 6.3 for selection of cleaning agents.

5.2 Calibration under process conditions

In the 'service' position of the electrode guide, the electrode is sealed off from the medium.

Cleaning or calibration fluid is supplied to the part of the electrode in contact with the medium via the flushing connections (see chapter 3.6).

Calibration sequence
Cleaning (as necessary)
Flushing with water
Blow-drying with air
Addition of buffer solution 1
Flushing with water
Blow-drying with air
Addition of buffer solution 2
Flushing with water

6 Maintenance

6.1 Cleaning

Electrode soiling may impair measurement to such an extent that the electrode ceases to function at all, e.g. due to coatings on the pH-sensitive glass membrane (poor response time and low sensitivity / slope, unstable measured values).

In order to guarantee reliable measurement, the electrodes must be cleaned regularly. The frequency and intensity of cleaning will depend on the type of medium to be measured. Always clean before calibration!

6.2 Manual cleaning

All parts of the electrode and assembly in contact with the medium must be cleaned. Please note the following:

- Remove light coatings and soiling using a suitable cleaning solution.
- Use a soft brush and suitable cleaning solution to remove adhering dirt. Stubborn dirt must be dissolved by soaking in cleaning agent.
- Rinse the electrode with distilled water after cleaning and recalibrate the measuring system.



Caution

Do not use any abrasive cleaning agents! These may result in irreparable damage to the measuring surface of the electrode. Traces of cleaning agent not removed after cleaning may result in inaccurate measurement.

6.3 Selection of cleaning agents

The selection of cleaning agents will depend on the type of soiling.

The types of soiling most frequently encountered and the appropriate cleaning agents are listed in the following table:

Soiling, coating	Cleaning agent
Grease, oil	(Alkaline) agents containing surfactants or water-soluble, organic solvents (e.g., alcohol)
Limestone deposits, cyanide deposits Thick biological and metal hydroxide coatings	Hydrochloric acid (10%), diluted to approx. 3% in injector
Sulphide deposits	Mixture of hydrochloric acid (10%) and thiourea (saturated)
Protein deposits	Mixture of hydrochloric acid (10%) and pepsin (saturated)
Fibres, suspended substances	Pressure water, possibly containing wetting agents
Thin biological coatings	Pressure water

6.4 Replacement of wearing parts



Caution

The electrode guide must be dismantled by authorised and trained personnel only!

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